

Price Discrimination

When producers have market power and sell a good or service that cannot be resold, the possibility of price discrimination arises. *Price discrimination* exists when a producer charges different prices to different customers for the same item, for reasons other than differences in cost. The seller needs to be able to divide the total market for the good into separate submarkets, each with a different demand for the good. There also must be no possibility of resale of the product between the submarkets; otherwise the different submarkets will collapse into a single market.

Part A: Regular Monopoly with No Price Discrimination

Pat's Patriotic Tattoos is the only tattoo parlor in town. Pat provides only one tattoo—the American flag. There are 10 consumers in town who are willing to buy one tattoo, and they vary in their willingness to pay. One consumer is willing to pay \$20 for a tattoo, another is willing to pay \$18, and so forth, down to the tenth consumer who is willing to pay only \$2. Table 3-13.1 shows the demand schedule for Pat's flag tattoo.

1. Complete Table 3-13.1 assuming the firm can only charge one price for its service. (There is no price discrimination yet.) If Pat wants to sell three units, she will sell all three units at a price of \$16, so her TR is \$48. Put each MR value at the higher of the two output levels.



Table 3-13.1

Demand Schedule for Pat's Tattoo

Price	Quantity	Total revenue (TR)	Marginal revenue (MR)
\$20	1	\$20	+\$20
\$18	2	\$36	+\$16
\$16	3	\$48	+\$12
\$14	4	\$56	+\$8
\$12	5	\$60	+\$4
\$10	6	\$60	+\$0
\$8	7	\$56	-\$4
\$6	8	\$48	-\$8
\$4	9	\$36	-\$12
\$2	10	\$20	-\$16

2. What is the total consumer surplus if Pat sells three units at a price of \$16?

CS is the difference between the highest price a consumer is willing to pay and the price he or she actually does pay. $CS = (\$20 - \$16) + (\$18 - \$16) + (\$16 - \$16) = \$4 + \$2 + \$0 = \6 .

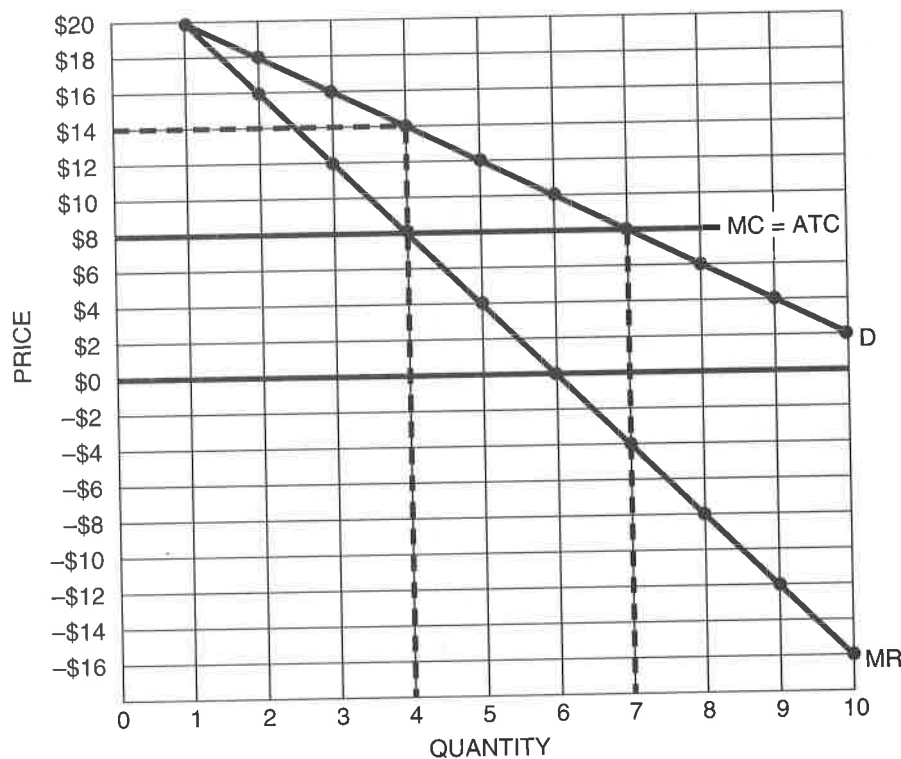
3. What is the total consumer surplus if she sells five units at a price of \$12?

$$\begin{aligned} CS &= (\$20 - \$12) + (\$18 - \$12) + (\$16 - \$12) + (\$14 - \$12) + (\$12 - \$12) \\ &= \$8 + \$6 + \$4 + \$2 + \$0 \\ &= \$20. \end{aligned}$$

4. In Figure 3-13.1, draw the demand curve for Pat's tattoos.



Figure 3-13.1
Demand for Pat's Tattoos



Part B: Perfect Price Discrimination (Also Called First-Degree Price Discrimination)

Perfect price discrimination is a monopolist's dream because it means that the firm can charge each individual consumer the highest price that he or she is willing to pay for the firm's product. As we will see in this activity, perfect price discrimination eliminates all consumer surplus and increases the monopolist's total profit above what it would if the firm sold all output at one price. For the questions in this section, assume that Pat's average total cost and marginal cost are constant and equal to \$8 ($ATC = MC = \8).

5. In Figure 3-13.1, draw the firm's $ATC=MC$ curves as a horizontal line at \$8.

6. If this were a perfectly competitive market, the MC curve would represent the supply of the product. If Pat produces the perfectly competitive quantity and charges the perfectly competitive price:

(A) How many tattoos will she supply? Why?

She will produce 7 units because that is where $P = MC$. In perfect competition, a firm can sell all it wants at the current price, so P and MR are the same value. Since we assume $MC = \$8$, she will produce 7 units.

(B) What price will she charge for each tattoo? Why?

Her price will be \$8 because she will operate where $P = MC$.

(C) What is the amount of consumer surplus? Why?

$$\begin{aligned} CS &= (\$20 - \$8) + (\$18 - \$8) + (\$16 - \$8) + (\$14 - \$8) + (\$12 - \$8) + (\$10 - \$8) + (\$8 - \$8) \\ &= \$12 + \$10 + \$8 + \$6 + \$4 + \$2 + \$0 \\ &= \$42. \end{aligned}$$

7. If Pat produces the monopoly quantity and charges the monopoly price:

(A) Draw her marginal revenue (MR) curve in Figure 3-13.1.

(B) How many tattoos will she supply? Why?

She will produce 4 units because that is where $MR = MC$. The monopolist compares MR to MC , not P to MC .

(C) What price will she charge for each tattoo? Why?

She will charge \$14 for each of the 4 units because in the demand schedule we see that is the highest price consumers will pay for 4 units.

(D) What is the amount of consumer surplus? Why?

$$CS = (\$20 - \$14) + (\$18 - \$14) + (\$16 - \$14) + (\$14 - \$14) = \$6 + \$4 + \$2 + \$0 = \$12.$$

8. Now assume Pat knows the tastes and preferences of all consumers and the conditions necessary for first-degree price discrimination apply.
- (A) Does the MR curve for the non-discriminating monopolist still apply? Why?
No. She is able to charge each consumer a unique price so her demand curve is also her marginal revenue curve because it shows the increase in her total revenue from each extra unit she sells.
- (B) How many tattoos will she supply? Why?
She will supply 7 tattoos because that is where $MR = MC$. In this case, you also can say that is where $P = MC$.
- (C) Complete Table 3-13.2, which shows what price she will charge each individual consumer for her/his tattoo.



Table 3-13.2

Prices Charged by a Perfectly Discriminating Monopsonist

Consumer	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Price	\$20	\$18	\$16	\$14	\$12	\$10	\$8	\$6	\$4	\$2

- (D) What is the amount of consumer surplus?

There is no consumer surplus because Pat charged each consumer the highest price he or she was willing to pay for a tattoo.

9. In Table 3-13.3, show Pat's total profit under each of the three market structures. Remember our assumption that $ATC = MC = \$8$.



Table 3-13.3

Profit in Each Market Structure

Type of market	Pat's total profit
Perfect competition	\$0
Regular monopoly	\$24
Perfect price discrimination monopoly	\$42

Perfect competition: $T\Pi = TR - TC = (Q)(P) - (Q)(ATC) = (7)(\$8) - (7)(\$8) = \0 .

Regular monopoly: $T\Pi = TR - TC = (Q)(P) - (Q)(ATC) = (4)(\$14) - (4)(\$8) = \24 .

*Discriminating monopoly: $T\Pi = TR - TC = (\text{sum of prices}) - (Q)(ATC)$
 $= (\$20 + \$18 + \$16 + \$14 + \$12 + \$10 + \$8) - (7)(\$8) = \$98 - \56
 $= \$42$.*

10. How does the total profit of the perfectly discriminating monopolist compare to the consumer surplus that existed in the perfectly competitive market? [See Question 6 (C).] Why?
They are equal because the perfectly discriminating monopolist was able to capture all the consumer surplus from each individual consumer.
11. Is the total profit for a regular monopolist different from the total profit of a monopolist that is able to practice perfect price discrimination? Why?
Yes. The total profit of a nondiscriminating monopolist is smaller than that of the monopolist who can practice perfect price discrimination. The latter captures all the consumer surplus because it does not have to sell its output at one price.
12. Is the output the same for perfect competition and perfect price discrimination? Why?
Yes. In these two examples, price is equal to marginal revenue. The perfectly competitive firm can sell all the output it wants at the market price, so it has $P = MR$. Even though the perfectly discriminating monopolist must reduce its price to sell more output, it also has $P = MR$ because it can charge a unique price to each consumer. Because each firm faces the same MC, the output in each market structure will be the same where $P = MC$.
13. Is there a deadweight loss resulting from the non-discriminating monopolist? What about from the monopolist with first-degree price discrimination?
There is a deadweight loss from the nondiscriminating monopolist because the output is less than the socially optimal output which would occur in the perfectly competitive model. There is no deadweight loss from the discriminating monopolist, however, because the output is the same as in the perfectly competitive model.
14. If an orange sells in Nebraska for \$1.00 and the same quality orange sells in Florida for only \$0.50, is this clear evidence of price discrimination? Why?
No. The price difference could reflect the cost of transporting the orange from Florida (where it was produced) to Nebraska.
15. What is an example of price discrimination that works in favor of students?
Students often receive a lower price for movie tickets than do "regular" people. Because it is the same service at the same cost of production, this is an example of price discrimination.